

IN THE CLAIMS

Please cancel claims 23 and 24 without prejudice or disclaimer.

15. (Amended) A method of operating an internal combustion engine having a crankshaft driven by at least one piston moving through at least a compression stroke and an expansion stroke aided by combustion taking place within a cylinder, wherein the compression stroke results in the compressing of air and gaseous fuel within the cylinder, said method comprising the step of selectively varying one or more of the density, temperature, pressure and turbulence of a primary air charge within a cylinder, after the primary air charge has been introduced to the cylinder through an inlet valve and the inlet valve closed.

62 16. (Amended) The method of claim 15, wherein the adjusting step includes at least the steps of compressing a secondary air charge prior to the compressing within the cylinder, thus generating a pre-compressed secondary air charge and delivering the pre-compressed secondary air charge to the cylinder.

17. (Amended) The method of claim 16, wherein the adjusting step further includes at least the step of selectively channeling the pre-compressed secondary air charge through a cooling device prior to delivery to the cylinder.

18. (Amended) The method of claim 17, further comprising the step of: closing an intake valve so as to provide a compression ratio lower than the expansion ratio of the engine.

19. (Amended) A method of operating an internal combustion engine, said method comprising the steps of:

- (i) producing an air charge;
- (ii) controlling the temperature, density and pressure of the air charge;
- (iii) transferring the air charge to a power cylinder of the engine;
- (iv) then compressing the air charge at a lower-than-normal compression ratio;

- (v) causing a pre-determined quantity of charge-air and fuel to produce a combustible mixture;
- (vi) causing the mixture to be ignited within the power cylinder; and
- (vii) expanding the combustion gas against a piston operable in the power cylinder with the expansion ratio of the power cylinders being substantially greater than the compression ratio of the power cylinders of the engine.

- b2
- 20. (Amended) The method of claim 19, further comprising the steps of: repeating steps (i) through (vii); and periodically selectively varying the density of the air charge from one transferring step to another transferring step.
  - 21. (Amended) The method of claim 19, further comprising the steps of: repeating steps (i) through (vii); and maintaining the density of the air charge at substantially the same pre-selected density during each of the repeated transferring steps.
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Please add the following claims 25-71:

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- b3
- 25. (New) A method for operating an internal combustion engine, the method comprising the steps of:

directing air through a first intake port to a cylinder during an intake stroke of a piston cooperating with the cylinder; and,

directing compressed air through a second intake port to the cylinder only during a compression stroke of the piston.

- Sub E
- 26. (New) The method of claim 25, further comprising the steps of:  
cooling the compressed air prior to entry thereof into the cylinder.

- 27. (New) The method of claim 25, further comprising the steps of:  
adjusting the air charge volumes within the cylinder, thereby providing a compression ratio lower than the expansion ratio of the engine.

*Sub E2*  
28. (New) The method of claim 25, further comprising the steps of:  
controlling operation of a compressor generating the compressed air and intake valves cooperating with the first and the second intake ports; and,  
controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.

29. (New) A method for operating an internal combustion engine, the method comprising the steps of:

directing air at a first pressure into a cylinder during an intake stroke of a piston cooperating with the cylinder; and,

directing air at a second pressure into the cylinder only during a compression stroke of the piston.

*b3*  
30. (New) The method of claim 29, further comprising the step of:  
cooling the air at the second pressure prior to entry thereof into the cylinder.

31. (New) The method of claim 29, further comprising the steps of:  
compressing the air at the first pressure by a first compressor; and,  
compressing the air at the second pressure by a second compressor.

*ly*  
32. (New) The method of claim 31, further comprising the steps of:  
controlling operation of a the first and the second compressors; and,  
controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.

33. (New) The method of claim 29, further comprising the steps of:  
adjusting the air charge volumes within the cylinder, thereby providing a compression ratio lower than the expansion ratio of the engine.

34. (New) The method of claim 29, wherein the second pressure is greater than the first pressure.

35. (New) A method of operating an internal combustion engine, the method comprising the steps of:

introducing air through a first intake port into a cylinder during an intake stroke of a piston cooperating with the cylinder; and,

introducing compressed air through a second intake port into the cylinder during a compression stroke of the piston.

36. (New) The method of claim 35, wherein a first intake valve cooperates with the first intake port and a second intake valve cooperates with the second intake port, the second intake valve occupying an open position only while the first intake valve occupies a closed position.

37. (New) The method of claim 36, further comprising the steps of:

controlling operation of a compressor generating the compressed air and the first and the second intake valves; and,

controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.

38. (New) The method of claim 35, wherein a first intake valve cooperates with the first intake port and a second intake valve cooperates with the second intake port, the second intake valve occupying an open position only during the compression stroke.

39. (New) The method of claim 38, further comprising the steps of:

controlling operation of a compressor generating the compressed air and the first and the second intake valves; and,

controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.

*Sub E3*  
40. (New) The method of claim 35, further comprising the steps of:  
cooling the compressed air prior to entry thereof into the cylinder.

41. (New) The method of claim 35, further comprising the steps of:  
adjusting the air charge volumes within the cylinder, thereby providing a  
compression ratio lower than the expansion ratio of the engine.

42. (New) A method of operating an internal combustion engine, the method comprising the steps of:

lightly compressing a low pressure air charge outside a cylinder;  
directing the low pressure air charge through a first intake port into a cylinder  
cooperating with a piston, during an intake stroke of the piston;  
compressing a high pressure air charge outside of the cylinder; and,  
directing the high pressure air charge through a second intake port into the  
cylinder, during a compression stroke of the piston.

*b3*  
<sup>2</sup>  
~~43.~~ (New) The method of claim <sup>1</sup>~~42~~, wherein the low pressure air charge is at a first pressure  
and the high pressure air charge is at a second pressure, the second pressure being greater than  
the first pressure.

<sup>3</sup>  
~~44.~~ (New) The method of claim <sup>1</sup>~~42~~, wherein the low pressure air charge is compressed by a  
first compressor and the high pressure air charge is compressed by a second compressor.

<sup>4</sup>  
~~45.~~ (New) The method of claim <sup>1</sup>~~42~~, wherein a first intake valve selectively occludes the first  
intake port and a second intake valve selectively occludes the second intake port, the second  
intake valve occupying an open position only while the first intake valve occupies a closed  
position.

*Sub E3*  
46. (New) The method of claim 45, further comprising the steps of:

*Cont Sub E4*  
controlling operation of a compressor generating the high pressure air charge and the first and the second intake valves; and,

controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.

<sup>6</sup>  
~~47.~~ (New) The method of claim <sup>1</sup>42, wherein a first intake valve cooperates with the first intake port and a second intake valve cooperates with the second intake port, the second intake valve occupying an open position only during the compression stroke.

*Sub E5*  
<sup>48.</sup> (New) The method of claim 47, further comprising the steps of:

controlling operation of a compressor generating the high pressure air charge and the first and the second intake valves; and,

controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.

*b3*  
<sup>8</sup>  
~~49.~~ (New) The method of claim <sup>1</sup>42, further comprising the step of:  
cooling the low pressure air charge prior to entry thereof into the cylinder.

<sup>9</sup>  
~~50.~~ (New) The method of claim <sup>1</sup>42, further comprising the step of:  
cooling the high pressure air charge prior to entry thereof into the cylinder.

*b3*  
51. (New) A method for operating an internal combustion engine, the method comprising the steps of:

directing a primary air charge through a first inlet port into a cylinder;  
compressing a secondary air charge outside of the cylinder; and,  
introducing the secondary air charge through a second inlet port of the cylinder, after compression has begun within the cylinder.

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Sub #6  
52. (New) The method of claim 51, wherein the primary air charge is at a first pressure and the secondary air charge is at a second pressure, the second pressure being greater than the first pressure.

53. (New) The method of claim 51, wherein the directing of the primary air charge into the cylinder is completed before the introducing of the secondary air charge into the cylinder.

54. (New) The method of claim 51, wherein a first intake valve selectively occludes the first intake port and a second intake valve selectively occludes the second intake port, the first intake valve occupying an open position only while the second intake valve occupies a closed position.

55. (New) The method of claim 54, further comprising the steps of:

b3  
controlling operation of a compressor generating the secondary air charge and the first and the second intake valves; and,

controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.

56. (New) The method of claim 51, wherein a first intake valve cooperates with the first intake port and a second intake valve cooperates with the second intake port, the second intake valve occupying an open position only during the compression stroke.

57. (New) The method of claim 56; further comprising the steps of:

controlling operation of a compressor generating the secondary air charge and the first and the second intake valves; and,

controlling one or more air charge characteristics selected from the group consisting of turbulence, density, pressure, temperature, mean pressure and peak pressure.

58. (New) The method of claim 51, further comprising the step of:

lightly compressing the primary air charge prior to directing thereof into the cylinder.

*Sub E*  
59. (New) The method of claim 51, further comprising the step of:  
cooling the primary air charge prior to entry thereof into the cylinder.

60. (New) The method of claim 51, further comprising the step of:  
cooling the secondary air charge prior to entry thereof into the cylinder.

61. (New) A method for operating an internal combustion engine, said method comprising the steps of:

directing air to a cylinder through a first intake port; and,  
directing air to the cylinder through a second intake port having an intake valve cooperating therewith, the intake valve opening and closing during a compression stroke of a piston cooperating with the cylinder.

*63 Sub E*  
62. (New) The method of claim 61, further comprising the steps of :  
directing air at a first pressure to the first intake port; and,  
directing air at a second pressure to the second intake port.

63. (New) The method of claim 62, wherein the second pressure is greater than the first pressure.

*Sub E*  
64. (New) The method of claim 61, further comprising the step of:  
cooling the air directed into the cylinder.

65. (New) The method of claim 61, further comprising the step of:  
adjusting the air charge volumes within the cylinder, thereby providing a compression ratio lower than the expansion ratio of the engine.

66. (New) A method for operating an internal combustion engine, said method comprising the steps of:



directing air to a cylinder through an intake port, wherein the intake valve opens and closes during a compression stroke of a piston cooperating with the cylinder.

67. (New) The method of claim 66, further comprising the step of:  
cooling the air directed into the cylinder.

68. (New) The method of claim 66, further comprising the step of:  
adjusting the air charge volumes within the cylinder, thereby providing a  
compression ratio lower than the expansion ratio of the engine.

69. (New) A method for operating an internal combustion engine, said method comprising  
the steps of:  
directing air into a cylinder through an intake port having an intake valve  
cooperating therewith, wherein the intake valve opens during a compression stroke of a  
piston cooperating with the cylinder.

70. (New) The method of claim 69, further comprising the step of:  
compressing the air outside the cylinder.

71. (New) The method of claim 69, further comprising the step of:  
adjusting the air charge volumes within the cylinder, thereby providing a  
compression ratio lower than the expansion ratio of the engine.

#### REMARKS

Applicant respectfully requests reconsideration of the above-referenced application.  
Upon entry of the above amendment claims 15-21 and 25-71 are pending in the present  
application.

**Rejection of Claims 15-21, 23 and 24 under 35 U.S.C. §112, 2<sup>nd</sup> paragraph**